AMT A172: POWERPLANT PROPELLER AND LUBRICATING SYSTEMS FAA

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	095020 - Aviation Powerplant Mechanics
Units	4 Total Units
Hours	153 Total Hours (Lecture Hours 45; Lab Hours 108)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

Fundamental theory of propellers and lubrication system components. Practical experience in overhauling, repairing, testing, and troubleshooting different types of systems and components. ADVISORY: AMT A170. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Inspect, check, service, troubleshoot and repair fixed-pitch, constant-speed and feathering propellers, and propeller governing systems.
2. Inspect, check, service, and troubleshoot engine lubrication system components.

Course Objectives

- 1. Demonstrate and perform minor repairs, balancing and inspection of propellers.
- 2. Locate and interpret engine propeller critical range and static limits information.
- 3. Explain the operation and control of a controllable pitch propeller.
- 4. Identify and describe the forces acting on a propeller.
- 5. Measure propeller blade pitch angles.
- 6. Demonstrate and analyze procedures outlined in the overhaul manual for repairs, overhaul and operation.
- 7. Explain the operation of a propeller governor and perform testing and rigging procedures.
- 8. Identify the lubricant to be used to service a specific propeller.
- 9. Gather reference information and explain the operation of propeller synchronizing systems.
- 10. Explain the operation of turbo propeller systems and subsystems.
- 11. Diagram and explain the operation of wet and dry sump lubrication systems and perform inspection of systems and filters.
- 12. Identify and analyze oil samples and contamination.
- 13. Identify and explain the components on a turbine and reciprocating engine oil lubrication system.

Lecture Content

PROPELLERS Inspect, check, service and repair fixed-pitch, constant-speed and feathering propellers, and propeller governing systems Identify and describe the forces acting on a propeller Measure propeller blade pitch angles Locate and interpret engine-propeller "critical range" information Locate and interpret "static limit" information for fixed pitch propeller Describe the operation and control by a counter-weight propeller Describe the operation and control of a hydromatic propeller Describe the operation and control of non-counterweight variable pitch, feathering, and reversing propellers Describe the operation and control of a turbine engine propeller system Inspect and identify probable location of defects in the metal tipping of propellers Smooth nicks, cuts, and scratches in the leading and trailing edges of metal propeller blades Repair aluminum alloy propeller blades Install, troubleshoot and remove propellers Check operation of a full feathering and reversing propeller Remove and install a propeller on a tapered shaft Check track of a propeller Externally adjust a rig a propeller governor Troubleshoot descriptions of faults in a hydromatic propeller Inspect, check, service and repair propeller synchronizing and ice control systems Identify components and describe the operation of propeller anti-icing systems Locate reference information and describe the operation of propeller synchronizing systems Identify and select propeller lubricants Identify the lubricant to be used to service a specific propeller Balance propellers Interpret information and describe the procedure for balancing fixed pitch and variable pitch propellers Repair prope ller control system components Describe the action of a propeller governor and the forces which control propeller pitch Perform the operation necessary to match direction of governor relation to the rotation of the engine drive LUBRICATION SYSTEM Identify and select lubricants Identify characteristics of lubricants Identify the secondary functions of lubricating oils Recognize and identify acceptable lubricants Inspect, check, service, troubleshoot and repair engine lubrication systems Diagram and explain the operation of wet and dry sump lubrication systems Change oil, check screens Service an oil by-pass valve Service disc-type oil filters Describe purpose of oil pressure gauge line restrictors Identify components of an oil scavenging system and describe operation of the system and troubleshoot Interpret FAA regulations pertaining to oil supply tanks Explain the purpose and describe the operation of an oil dilution system Adjust oil pressure on an operable engine Interpret instrument indications Describe the lubrication of a valve mechanism Install rings on a piston and describe the factors effecting oil consumption in a piston engine Repair engine lubrication system components Inspect, remove, clean and reinstall oil lines Identify and describe oil temperature regulation Explain the procedure for cleaning and testing oil pump

Lab Content

Faculty input required.

Method(s) of Instruction

- Lecture (02)
- Lab (04)

Instructional Techniques

Instruction methodologies will include, but not necessarily be restricted to the following: 1. Detailed multimedia/lectures of each topic covered. 2. Student feedback during each lecture. 3. Detailed illustrative discussion of textbook examples. 4. Concentration on schematic reading and system operation fault diagnosis. 5 Practical troubleshooting. 6. Laboratory exercises pertaining to subjects

discussed during which students work individually or in small groups.

Reading Assignments

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Writing Assignments

Student must show proficiency in writing logbook entries using correct punctuation, sentence structure and readability.

Out-of-class Assignments

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Demonstration of Critical Thinking

Interview, list, multiple choice exams, and short answer.

Required Writing, Problem Solving, Skills Demonstration

Student must show proficiency in writing logbook entries using correct punctuation, sentence structure and readability.

Textbooks Resources

1. Required Jeppesen. AC43.13-1B2A, Acceptable Methods, Techniques, and Practices-Aircraft Inspection and Repair, ed. Superintendent of Documents; U.S. Government Printing Office, 2001 Rationale: - 2. Required Jeppensen. AP Technician ?POWERPLANT? Textbook, ed. Englewood, CO: Jeppesen Sanderson, 1998 Rationale: latest 3. Required Kroes, Michael J and Thomas Wild. Aircraft Powerplant, 7th ed. New York: Glencoe/McGraw-Hill, 1994 Rationale: latest